

REMARKS

This response addresses the Office Action (FINAL) of 9/06/2006.

Claims 1, 4-5, and 8 remain in the case. No new claims have been added.

On page 4 of the office Action claims 1, 4, 5, and 8 were rejected under 35 U.S.C. 103(a) as unpatentable over Shim et al. (US 6,531,784), here after Shim, in view of Kang. et al. (US 2003/0178710 A1), here after “Kang.”

Claim 1 is amended to read as followsas follows:

1. (currently amended) A die containing package comprising:
a die defining electrical die contacts, **the die contacts arranged along a first and an opposite side of the die,**
a substrate defining first substrate contacts,
flattened electrical conductive balls attached to the die contacts and making electrical connection thereto,
electrical conductive runs on the substrate **that run substantially under the die** connecting the first substrate contacts, **wherein the first substrate contacts are located adjacent to the first side of the die,** to second substrate contacts, wherein the second substrate contacts are located **adjacent to the opposite side of the die,**
electrically conductive wires with first ends making electrical connections to the first substrate contacts, wherein the wires are formed to run substantially parallel to the surface of the die, and wherein the other ends are horizontally attached to the flattened balls.

No new matter is added as evidenced by the original FIG.s 3- 6 and the text supporting these FIG.s, e.g., see page 5, lines 21.

It appears that the prior use of the word “opposite” was confusing. As amended “opposite” refers to locations on the substrate that are on “opposite” sides of the die. The conductive runs travel under the die from one side of the die (where there are die contacts) to the opposite side of the die (where there are other die contacts). See FIG.s 3- 6 of the original application, where the etched runs traverse under the die to contacts

on substrate that are on opposite sides of the die. For example, in FIG. 3, the wire bond 117 connects a pad 111 on the chip 108 to contact 104 on the substrate. FIG. 5 shows the etched run on the substrate that connections contact 104 to contact 123. Note that contacts 104 and 123 are on opposite sides of the substrate with respect to the chip 108. This configuration is directly described in the portion of amended claim 1 as follows:

electrical conductive runs on the substrate **that run substantially under the die connecting the first substrate contacts, wherein the first substrate contacts are located adjacent to the first side of the die,** to second substrate contacts, wherein the second substrate contacts are located **adjacent to the opposite side of the die,**

A similar limitation is added to the method claim 5 that corresponds to the apparatus claim 1.

On page 2 over onto page 3 of the Office Action the Examiner states with respect to Shim's FIG. 9, "... a die 14 making electrical contacts, a substrate defining first substrate contacts, flattened electrical conductive balls 58 attached to the die contacts and making electrical connections thereto, electrical conductive runs 22, 25 on the substrate 12 **connecting the first substrate contacts (i.e. the electrical contact formed by the runs and the wires 28)** to second substrate contacts 18 **wherein the second substrate contacts are located on the substrate opposite the first substrate contacts,** ..."

Shim's FIG. 9 (and all the FIG.s and discussion in Shim are consistent) shows that a die contact, say the left top contact from chip 14, connects to a wire 28 to the top surface of the substrate 12, both the wire and the surface on the left side of the FIG. On this left surface the runs 32 continue to vias 30 through the substrate to balls 18 on bottom left surface of the substrate. See Shim's FIG. 1, and the text for all Shim's drawings. Shim uses the designation numbers generically. In Shim the left contact on 14 to the wire 28 to the run 32 to the via 30 to the ball 18 never cross over to the right side of the chip or the substrate. Shim never suggests such a cross over, and, moreover Shim's disclosure will not allow the die up to die down advantage of the present invention. The Examiner is construing the top versus the bottom of the substrate of Shim as

“opposites.” He so states at the bottom of page 5 over onto page 6. This definition of “opposite” is foreign to the original application and the responses made throughout this prosecution.

The present invention allows an IC designed for die down package to be used in a die up package. See the title of this application. There is a documented advantage to the present invention where only one die type need to be fabricated, as pointed out in the file history of this application.

Shim simply does not suggest in any fashion or illustrate in any fashion this left to right reversal to allow the die down die to be placed in a die up package by using the inventive substrate. Kang does not help, as pointed out at length in the prior response.

To reiterate, the present invention has a stated objective of providing a substrate that can be used to mount a “die-down” die in a “die-up” package, and the cross over etched runs under the die, as claimed, accommodate this objective. There is no suggestion in Kang or Shim to accommodate a different pin out and neither Kang nor Shim provides such cross overs or other means to accommodate dies with different pin outs.

I have tried to make the distinction very clear in the claims as now amended. I would appreciate the Examiner calling me to discuss the matter.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

/Edwin H. Paul/
Edwin H. Paul
Reg. No. 31,405
CESARI AND MCKENNA, LLP
88 Black Falcon Avenue
Boston, MA 02210-2414
(617) 951-3040